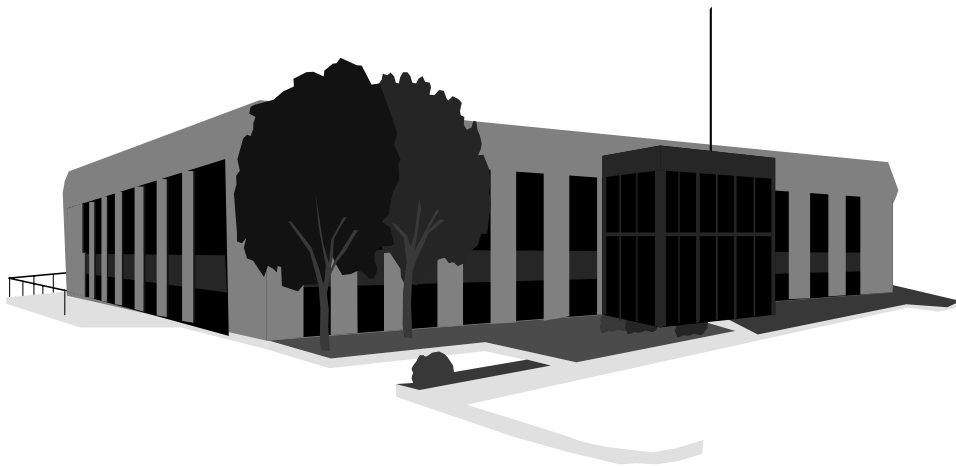


INDOOR AIR QUALITY ASSESSMENT

**Abraham Lincoln Elementary School
300 Chelmsford Street
Lowell, Massachusetts**



Prepared by:
Massachusetts Department of Public Health
Bureau of Environmental Health Assessment
June, 2000

Background/Introduction

At the request of the Lowell Health Department, the Massachusetts Department of Public Health (MDPH), Bureau of Environmental Health Assessment (BEHA) was asked to provide assistance and consultation regarding indoor air quality issues and health concerns at the Abraham Lincoln Elementary School in Lowell, Massachusetts.

On March 16, 2000 Cory Holmes, Environmental Analyst of the Emergency Response/Indoor Air Quality (ER/IAQ) Program and Suzan Donahue, Research Assistant, BEHA conducted an indoor air quality assessment. John Collins of the Lowell Health Department and Jeff Goor, Head Custodian, accompanied Mr. Holmes and Ms. Donahue for portions of the assessment.

The school is a two-story brick building built in 1993. The second floor consists mainly of general classrooms and library. The first floor contains general classrooms, offices, gymnasium and cafeteria.

Methods

Air tests for carbon dioxide were taken with the Telaire, Carbon Dioxide Monitor and tests for temperature and relative humidity were taken with a Mannix, TH Pen PTH 8708 Thermo-Hygrometer. Wind speed and direction were measured with a Davis, Wind Wizard, Wind Speed Indicator.

Results

This elementary school houses pre-kindergarten through grade 4, with a student population of approximately 500 and a staff of approximately 80. The tests were taken under normal operating conditions. Test results appear in Tables 1-7.

Discussion

Ventilation

It can be seen from the tables that the carbon dioxide levels were elevated above 800 ppm (parts per million) in seventeen of forty-five areas surveyed indicating a ventilation problem in these areas of the school. It should be noted that many rooms had open windows/doors during the assessment, which can greatly contribute to reduced carbon dioxide levels. Rooms 108, 201, 204 and 213 measured above 800 ppm with open windows, which indicates little air exchange in these rooms.

Fresh air in classrooms is supplied by a unit ventilator (univent) system (see [Figure 1](#)). Univents draw air from outdoors through a fresh air intake located on the exterior walls of the building and return air through an air intake located at the base of each unit. The mixture of fresh and return air is drawn through a filter and a heating coil, and is then expelled from the univent by motorized fans through fresh air diffusers. Univents were deactivated in a number of classrooms surveyed as well as in the cafeteria. Many of the univents appeared to have been deactivated by occupants. BEHA staff were able to activate several of these units using univent power switches (see Tables).

Obstructions to airflow, such as books, papers and posters on top of univents, and bookcases, tables and desks in front of univent returns, were seen in a number of classrooms (see Picture 1). To function as designed, univents and univent returns must remain free of obstructions. Importantly, these units must be activated and allowed to operate during school hours. Also noted in the interior of some univents were learning materials (i.e., flashcards), trash and debris (see Picture 2).

The mechanical exhaust ventilation system consists of ceiling mounted exhaust vents (see Picture 3). Exhaust vents were not functioning in a number of classrooms,

which can indicate that exhaust ventilation was turned off, or that rooftop motors were not functioning. BEHA staff examined exhaust motors on the roof and found that many exhaust motors were off. In addition, exhaust ventilation for the cafeteria and computer room was also deactivated during the assessment.

To maximize air exchange, the BEHA recommends that both supply and exhaust ventilation operate continuously during periods of school occupancy. In order to have proper ventilation with a univent and exhaust system, the systems must be balanced to provide an adequate amount of fresh air to the interior of a room while removing stale air from the room. The date of the last balancing of these systems was not available at the time of the assessment.

The Massachusetts Building Code requires a minimum ventilation rate of 15 cubic feet per minute (cfm) per occupant of fresh outside air or have openable windows in each room (BOCA, 1993, SBBRS, 1997). The ventilation must be on at all times that the room is occupied. Providing adequate fresh air ventilation with open windows and maintaining the temperature in the comfort range during the cold weather season is impractical. Mechanical ventilation is usually required to provide adequate fresh air ventilation.

Carbon dioxide is not a problem in and of itself. It is used as an indicator of the adequacy of the fresh air ventilation. As carbon dioxide levels rise, it indicates that the ventilating system is malfunctioning or the design occupancy of the room is being exceeded. When this happens a buildup of common indoor air pollutants can occur, leading to discomfort or health complaints. The Occupational Safety and Health Administration (OSHA) standard for carbon dioxide is 5,000 parts per million parts of air (ppm). Workers may be exposed to this level for 40 hours/week based on a time-weighted average (OSHA, 1997).

The Department of Public Health uses a guideline of 800 ppm for publicly occupied buildings. A guideline of 600 ppm or less is preferred in schools due to the fact that the majority of occupants are young and considered to be a more sensitive population in the evaluation of environmental health status. Inadequate ventilation and/or elevated temperatures are major causes of complaints such as respiratory, eye, nose and throat irritation, lethargy and headaches.

Temperature readings were within a range of 71° F to 82° F, with twenty-three of forty-five areas measuring above the BEHA recommended range. The BEHA recommends that indoor air temperatures be maintained in a range of 70° F to 78° F in order to provide for the comfort of building occupants. A number of temperature control complaints were expressed to BEHA staff during the assessment, which may indicate that thermostats are malfunctioning and may need repair/replacement. It should be noted that it was an unseasonably warm day with an outdoor temperature of 65° F. In many cases concerning indoor air quality, fluctuations of temperature in occupied spaces are typically experienced, even in a building with an adequate fresh air supply.

The relative humidity in this building was below the BEHA recommended comfort range in all areas sampled. Relative humidity measurements ranged from 16 to 35 percent. The BEHA recommends that indoor air relative humidity is comfortable in a range of 40 to 60 percent. Relative humidity levels in the building would be expected to drop during the winter months due to heating. The sensation of dryness and irritation is common in a low relative humidity environment. Low relative humidity is a very common problem during the heating season in the northeast part of the United States.

Microbial/Moisture Concerns

Several classrooms had a number of plants. Moistened plant soil and drip pans can be a source of mold growth. The lack of drip pans can lead to water pooling and mold growth on windowsills. Plants are also a source of pollen. Plants in several classrooms were noted near univent air diffusers (see Picture 4). Plants should be located away from the air stream of ventilation sources to prevent the aerosolization of mold, pollen or particulate matter throughout the classroom.

Water damaged pipe insulation and ceiling tiles were noted in the northwest stairwell, which can indicate leaks from either the roof or plumbing system (see Picture 5). If wetted repeatedly, porous materials (i.e., ceiling tiles, pipe insulation) can grow mold and be a source of unpleasant odors. Water-damaged building materials should be replaced after a water leak is discovered and repaired. A recent leak above the ceiling tiles was reported in Mr. Hall's Office adjacent to the library; a water-stained ceiling tile was noted in this area (see Picture 6).

Building occupants reported mold/mildew growth on plastic items in room 106 (see Picture 7). A black mold-like substance was noted on these items. Non-porous items should be cleaned with an appropriate antimicrobial. Porous items should be discarded because they are difficult to clean. Also noted in this room were spaces between the sink countertop and backsplash (see Picture 8). Improper drainage or overflow could lead to water penetration of countertop wood, the cabinet interior and behind cabinets. Reports of mold growth on water-damaged wallboard were also expressed to BEHA staff. Like other porous materials, if gypsum wallboard becomes wet repeatedly it can provide a medium for mold growth, which is difficult to clean. This material can be irritating to sensitive individuals. Water-damaged gypsum wallboard

cannot be adequately cleaned to remove mold growth. Once mold has colonized, the material should be removed and discarded.

In a number of classrooms, paper products, board games and other porous items were found stored underneath sinks. If these items become wet repeatedly they can provide a medium for mold growth. These items should be relocated to a warm, dry environment.

A perimeter inspection of the building was conducted in which BEHA staff noted a potential problem with the school's drainage system. Picture 9 shows a green organic material growing on exterior brickwork near the main entrance of the building. The pattern and location of growth appears to be evidence of improper drainage, which would allow back-splashing rainwater to impact on the ground below and chronically wet the exterior wall. Downspouts should be designed to direct rainwater away from the base of the building to prevent the chronic wetting of exterior walls which can result in damaged brickwork and/or mold growth. Over time rainwater can work its way into mortar and brickwork causing cracks and fissures, which can lead to water penetration.

Other Concerns

Several other conditions were noted during the assessment, which can affect indoor air quality. Cleaning products and other materials (e.g., spray paint, rubber cement and isopropyl alcohol) were found on counter-tops and beneath sinks in a number of classrooms (see Picture 10). These items can contain chemicals, which can be irritating to the eyes, nose and throat and should be stored properly and out of reach of students. In addition, rubber cement is a flammable material, which should be stored in a flameproof cabinet.

Also of note was the amount of materials stored inside classrooms. In classrooms throughout the school, items were observed to be piled on windowsills, tabletops, counters, bookcases and desks. The large number of items stored in classrooms provide a source for dusts to accumulate. These items, (e.g., papers, folders, boxes, etc.) make it difficult for custodial staff to clean in and around these areas. Dust can be irritating to eyes, nose and respiratory tract. These items should be relocated and/or should be cleaned periodically to avoid excessive dust build up. In addition, a number of exhaust vents in classrooms were noted with accumulated dust. If exhaust vents are not functioning, backdrafting can occur, which can re-aerosolize household dust particles.

Several classrooms contained dry erase boards and dry erase board markers. Materials such as dry erase markers and dry erase board cleaners may contain volatile organic compounds (VOCs), (e.g. methyl isobutyl ketone, n-butyl acetate and butyl-cellusolve) (Sanford, 1999), which can be irritating to the eyes, nose and throat.

Several areas have lamination machines and/or photocopiers. Lamination machines give off odors (see Picture 11). Volatile organic compounds (VOCs) and ozone can be produced by photocopiers, particularly if the equipment is older and in frequent use. Ozone is a respiratory irritant (Schmidt Etkin, D., 1992). School personnel should ensure that local exhaust ventilation is activated while equipment is in use to help reduce excess heat and odors in these areas.

Building occupants reported complaints of wood-stove smoke odors in classrooms. These odors may be attributed to the entrainment of wood-stove smoke from neighboring homes through univent fresh air intakes. Complaints of odors/allergies were also reported in the building. This was attributed to lawn mowing operations conducted during school hours and the entrainment of grass clippings and plant matter through univent fresh air intakes. Lawn mowing and other landscaping activities can generate

airborne particulate matter (i.e. dirt, dust and pollen) which can be irritating to the eyes, nose and respiratory system. On the day of the assessment, none of these odors were present.

A strong odor of deodorizer was detected upon entry into the boy's and girl's first floor restrooms. The source was identified as ceiling-mounted, time-released air fresheners (see Picture 12). Air fresheners and cleaning products contain chemicals that can be irritating to certain sensitive individuals. In addition, air fresheners do not remove materials causing odors, but rather mask odors which may be present in the area.

An unidentified white powdery material was noted on the return grill of the univent in room 215 (AV room) (see Picture 13). This material should be identified and cleaned to avoid being drawn in to the univent air stream and distributed throughout the room.

Science classroom 214 contained several terrariums; some containing rotted food items. Terrariums should be maintained to prevent mold/bacterial growth and/or unpleasant odors.

Conclusions/Recommendations

In view of the findings at the time of our inspection, the following recommendations are made:

1. To maximize air exchange, the BEHA recommends that both supply and exhaust ventilation operate continuously during periods of school occupancy independent of classroom thermostat control.
2. Examine each univent for function. Survey classrooms for univent function to ascertain if an adequate air supply exists for each room. Consider consulting a heating, ventilation and air conditioning (HVAC) engineer concerning the calibration of univent fresh air control dampers school-wide.
3. Change filters for air-handling equipment as per the manufacture's instructions or more frequently if needed.
4. Remove all blockages from univents and exhaust ventilators to ensure adequate airflow. Clean out interiors of univents.
5. Once both the fresh air supply and the exhaust ventilation are functioning properly, the system should be balanced.
6. For buildings in New England, periods of low relative humidity during the winter are often unavoidable. Therefore, scrupulous cleaning practices should be adopted to minimize common indoor air contaminants whose irritant effects can be enhanced when the relative humidity is low. To control for dusts, a HEPA filter equipped vacuum cleaner in conjunction with wet wiping of all non-porous surfaces is recommended. Drinking water during the day can help ease some symptoms associated with a dry environment (throat and sinus irritations).
7. Repair and/or replace thermostats as necessary to maintain control of comfort.

8. Keep plants away from univents in classrooms. Ensure plants have drip pans, examine drip pans for mold growth and disinfect areas with an appropriate antimicrobial where necessary.
9. Replace any remaining water-stained ceiling tiles, wall board and pipe insulation. Examine the areas above and around these areas for mold growth. Repair water leaks and disinfect areas of water leakage with an appropriate antimicrobial if necessary.
10. Inspect/install drainage to prevent the impact of back-splashing rainwater on exterior brickwork. Remove growth and disinfect areas noted in Picture 9 with an appropriate antimicrobial as needed.
11. Seal areas around sink in classroom 106, to prevent water-damage to interior of cabinets and adjacent wallboard. Inspect wallboard for water-damage and mold/mildew growth, repair/replace as necessary. Disinfect areas of microbial growth with an appropriate antimicrobial as needed.
12. Do not store paper products or other cellulose-containing materials beneath sinks. To prevent water damage to these materials, remove them from beneath sink of classroom 217.
13. Store cleaning products and chemicals properly and keep out of reach of students.
14. Relocate or consider reducing the amount of materials stored in classrooms to allow for more thorough cleaning of classrooms. Clean items regularly with a wet cloth or sponge to prevent excessive dust build-up.
15. Ensure exhaust ventilation is functioning in areas that contain lamination machines and photocopiers.
16. Consider using charcoal filters in univents of classrooms that have a history of wood stove odors from neighboring houses during the heating season.

17. Conduct mowing operations after school or during unoccupied periods. Shut off unit ventilators adjacent to mowing operations to avoid the entrainment of grass clippings and plant matter.
18. Refrain from using strong scented materials in classrooms and restrooms.
19. Clean and maintain aquariums, terrariums and animal cages to prevent bacterial/mold growth and/or odors.
20. Identify and clean white, powdery material on univent return grill in room 215 to prevent it from being drawn in to the univent air stream.

References

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OSHA. 1997. Limits for Air Contaminants. Occupational Safety and Health Administration. Code of Federal Regulations. 29 C.F.R 1910.1000 Table Z-1-A.

Sanford. 1999. Material Safety Data Sheet (MSDS No: 198-17). Expo® Dry Erase Markers Bullet, Chisel, and Ultra Fine Tip. Sanford Corporation. Bellwood, IL.

SBBRS. 1997. Mechanical Ventilation. State Board of Building Regulations and Standards. Code of Massachusetts Regulations. 780 CMR 1209.0

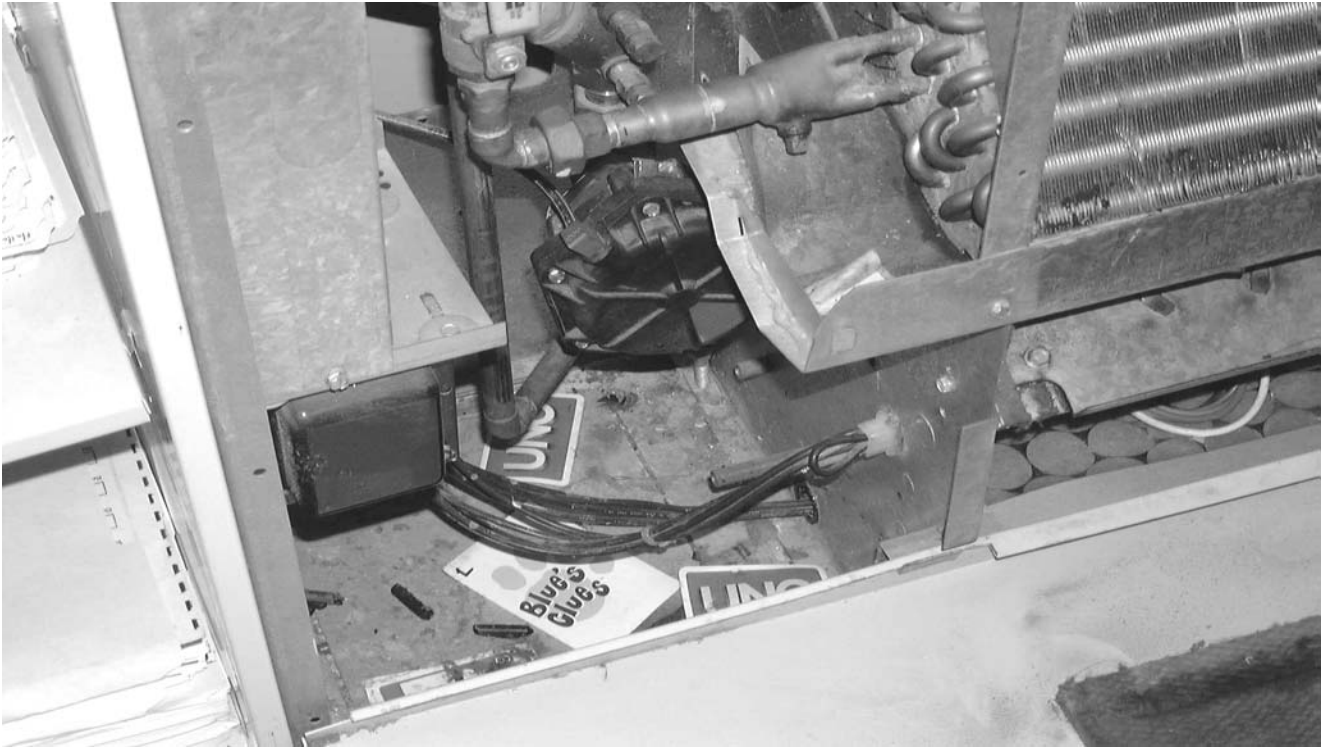
Schmidt Etkin, D. 1992. Office Furnishings/Equipment & IAQ Health Impacts, Prevention & Mitigation. Cutter Information Corporation, Indoor Air Quality Update, Arlington, MA.

Picture 1



Objects Stored on and around Classroom Univent Obstructing Airflow

Picture 2



Interior of Classroom Univent Note Materials and Debris on Floor

Picture 3



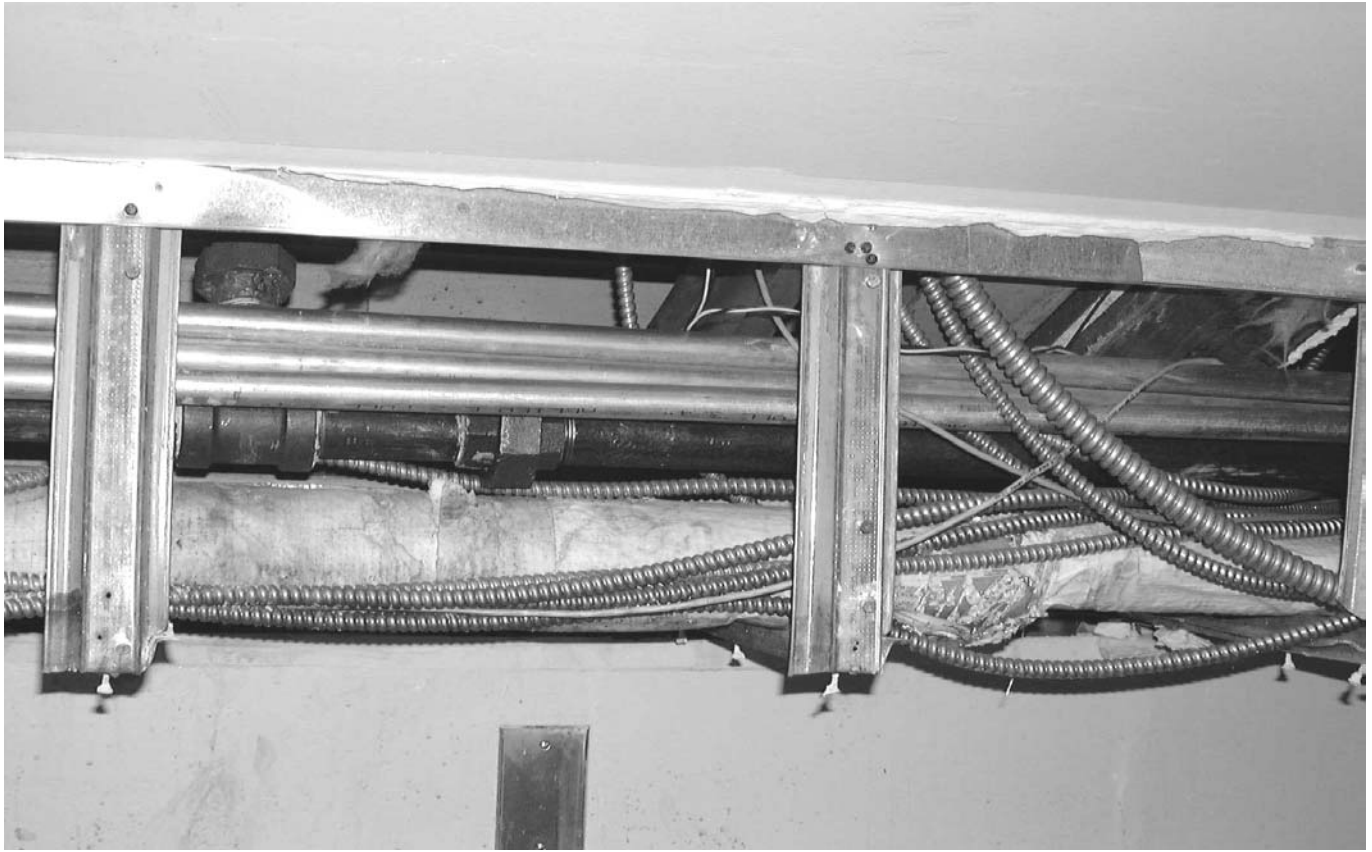
Ceiling-Mounted Exhaust Vent Noted in Classroom

Picture 4



**Flowering Plants Noted on Top of Classroom Univent
Note Soil and Plant Debris on Surface**

Picture 5



Water-Damaged Pipe Insulation in Northwest Hallway

Picture 6



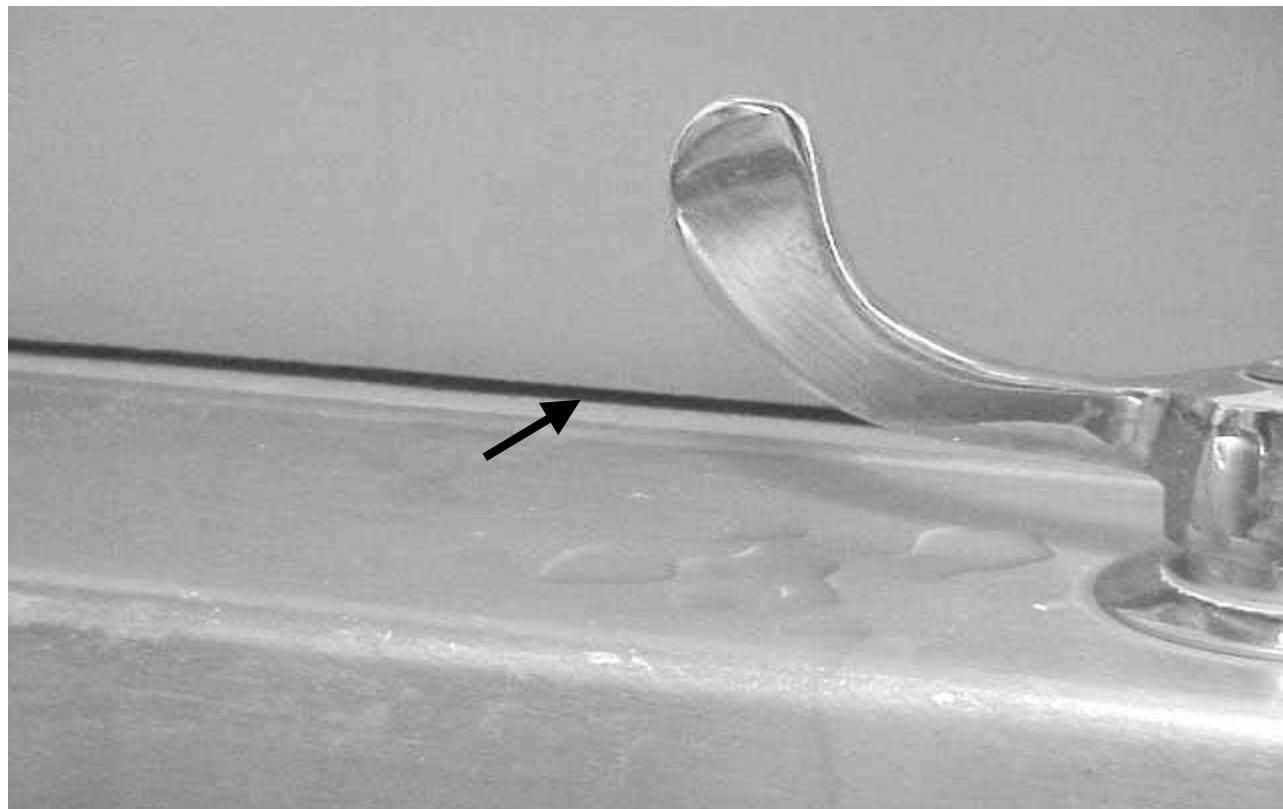
Water-Stained Ceiling Tile Noted in Office Adjacent to the Library

Picture 7



Plastic Container Noted in Room 106 with Possible Mold Colonies (as Indicated by Black Spots)

Picture 8



Space Noted Between Backsplash and Countertop in Room 106

Picture 9



Green Organic Material Noted on Exterior Brickwork

Picture 10



Cleaning Products Stored beneath Sink in Unlocked Classroom Cabinet

Picture 11



Photocopiers and Lamination Machine Noted in Teacher's Workroom

Picture 12



Ceiling-Mounted Time-Released Air Freshener Noted in Restroom

Picture 13



**Unidentified White Powdery Substance Noted on Univent Return Grill
in the AV Room (Room 215)**

TABLE 1

Indoor Air Test Results –Lincoln Elementary School, Lowell, MA – March 16, 2000

Remarks	Carbon Dioxide *ppm	Temp. °F	Relative Humidity %	Occupants in Room	Windows Openable	Ventilation		Remarks
						Intake	Exhaust	
Outside (Background)	423	65	40					weather conditions: clear, sunny, SW wind ~ 5 mph
Main Office Reception Area	670	74	28	2	yes	yes	yes	photocopier, 5 plants-3 window planters, carpet
Main Office Conference Room	624	74	29	5	yes	yes	yes	lamination machine, refrigerator, microwave
Room 113	855	75	30	22	yes	yes	yes	univent return blocked by cart, exhaust off, cleaning product under sink, dry erase board-odor
Room 111	979	75	31	22	yes	yes	yes	univent and exhaust off, 8 plants over univent-on paper plates, 1 CT, door open, cleaning product/towels/paper products under sink
Room 125	626	74	27	0	no	yes	yes	
Room 109	861	77	30	25	yes	yes	yes	items on univent/return blocked by table, exhaust off, 2 ceiling tiles ajar, cleaning product under sink, 2 plants, coffee maker-on/coffee odor, odor complaints reported (smoke/wood stove)

* ppm = parts per million parts of air
CT = water-damaged ceiling tiles

Comfort Guidelines

Carbon Dioxide - < 600 ppm = preferred
 600 - 800 ppm = acceptable
 > 800 ppm = indicative of ventilation problems
 Temperature - 70 - 78 °F
 Relative Humidity - 40 - 60%

TABLE 2

Indoor Air Test Results –Lincoln Elementary School, Lowell, MA – March 16, 2000

Remarks	Carbon Dioxide *ppm	Temp. °F	Relative Humidity %	Occupants in Room	Windows Openable	Ventilation		Remarks
						Intake	Exhaust	
Ladies Restroom							yes	spray cleaner on table, exhaust weak, no floor drain
Girls' Restroom							yes (3)	2 ceiling mounted air fresheners-odor, 3 small exhaust vents-on/weak, 1 large exhaust vent-off
Room 107 Music Room	1024	76	33	23	yes	yes	yes	univent and exhaust off, univent opened by BEHA-needs filter change
Room 219	727	80	24	19	yes	yes	yes	exhaust off, cleaning product on counter
Room 211	1130	81	27	23	yes	yes	yes	items on univent/return blocked, exhaust off, cleaning product on sink
Room 209	660	81	25	19	yes	yes	yes	2 CT, window open, 2 plants
Room 207	818	81	25	27	yes	yes	yes	
Room 205	682	80	25	16	yes	yes	yes	2 windows open, 2 plants, complaints-wheezing
Room 203	964	80	31	15	yes	yes	yes	
Room 201	1036	80	27	24	yes	yes	yes	window open, univent off/return blocked by table, 2 plants

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TABLE 3

Indoor Air Test Results –Lincoln Elementary School, Lowell, MA – March 16, 2000

Remarks	Carbon Dioxide *ppm	Temp. °F	Relative Humidity %	Occupants in Room	Windows Openable	Ventilation		Remarks
						Intake	Exhaust	
Room 204	852	80	26	22	yes	yes	yes	window open, cleaning product on desk
Room 202	802	80	33	1	yes	yes	yes	univent and exhaust off, cleaning product on counter
Room 115 – Gym	442	74	27	19	no	yes	yes	water fountain-panel missing-draft from wall space
Room 105	502	75	29	3	yes	yes	yes	univent partially blocked, cleaning product on sink, exterior door, restroom exhaust-on
Room 103	567	76	27	3	yes	yes	yes	1 CT, exterior door, restroom exhaust-on, 20+ plants over univent, stuff
Room 101	690	76	30	17	yes	yes	yes	univent return blocked, restroom exhaust-on, exterior door, bleach/plastic bags under sink
Room 228 Teachers' Workroom	575	77	29	0	no	yes	yes	lamination machine, soda machine on carpet, refrigerator, cardboard recycle box, cleaning product under sink, door open
Room 228A Teachers' Lounge	536	77	29	3	yes	yes	yes	photocopier under air diffuser (out of order), window and door open
Ladies' Restroom							yes	

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CT = water-damaged ceiling tiles

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TABLE 4

Indoor Air Test Results –Lincoln Elementary School, Lowell, MA – March 16, 2000

Remarks	Carbon Dioxide *ppm	Temp. °F	Relative Humidity %	Occupants in Room	Windows Openable	Ventilation		Remarks
						Intake	Exhaust	
Room 215	576	78	26	2	no	yes	yes	univent and exhaust off, cleaning product under sink
Room 217	685	80	26	28	yes	yes	yes	univent off-reported malfunctions, window and door open, elec. stove-on (making muffins), refrigerator
Room 213	973	82	35	21	yes	yes	yes	exhaust off, window open, 8 plants, cardboard recycle box, reported wood-stove odors
Room 206	744	81	20	15	yes	yes	yes	1 CT, window open, odor-strong/musty-like
Room 126D	548	71	25	1	no	yes	yes	door open
Principal's Office	539	71	28	1	yes	yes	yes	
Room 112 Art Room	549	76	23	0	yes	yes	yes	
Room 124 Teachers' Workroom	621	77	24	2	yes	yes	yes	photocopier, lamination machine, 2 plants
Room 110	950	79	23	26	yes	yes	yes	exhaust off, recycling-empty cans

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Relative Humidity - 40 - 60%

TABLE 5

Indoor Air Test Results –Lincoln Elementary School, Lowell, MA – March 16, 2000

Remarks	Carbon Dioxide *ppm	Temp. °F	Relative Humidity %	Occupants in Room	Windows Openable	Ventilation		Remarks
						Intake	Exhaust	
114	700	76	20	0	no	yes	yes	lots of stored materials
Room 126-E	648	76	20	1	no	yes	yes	
Mens' Restroom							yes	
Room 108	828	81	21	25	yes	yes	yes	window open, univent and exhaust off- univent activated by BEHA staff, heat complaints
Boys' Restroom							yes	ceiling mounted air fresheners
Cafeteria	665	79	22	~120	yes	yes	yes	5 CT, plants-standing water in drip pans
Custodial Closet							yes	allergy complaints
Room 106	764	78	23	16	yes	yes	yes	univent off, space around backsplash, reports of mold growth behind backsplash on wallboard/on toys and other items, 1 ceiling tile ajar
Room 104	900	77	24	19	yes	yes	yes	items on univent, cleaning product under sink

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Comfort Guidelines

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Temperature - 70 - 78 °F
Relative Humidity - 40 - 60%

TABLE 6

Indoor Air Test Results –Lincoln Elementary School, Lowell, MA – March 16, 2000

Remarks	Carbon Dioxide *ppm	Temp. °F	Relative Humidity %	Occupants in Room	Windows Openable	Ventilation		Remarks
						Intake	Exhaust	
Room 102	1003	78	25	20	yes	yes	yes	univent off, space under exterior door, 1 ceiling tile ajar, temperature complaints (cold)-thermostat problems
Northwest Stairwell								water damaged ceiling/insulation-exposed fiberglass
Room 216 Library	735	77	18	31	yes	yes	yes	plants
Reading Room	680	82	16	0	yes	yes	yes	dry erase board and cleaner, door open
Mr. Hall's Office	692	81	20	0	yes	yes	yes	reports of recent leak above ceiling tile, door open
AV Room 6 (215)	690	80	16	0	yes	yes	no	computer main frame, univent/air conditioning, white material
Room 218 Computer Room	703	81	18	23	yes	yes	yes	2 univents off, exhaust off, window open, 30 computers
Room 214	1223	82	22	1	yes	yes	yes	25 occupants gone 40 min., univent and exhaust off, plant and other items on univent, reports of noise from univent, snails in terrarium-old food
Room 212	924	81	21	16	yes	yes	yes	exhaust off

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CT = water-damaged ceiling tiles

Comfort Guidelines

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> 800 ppm = indicative of ventilation problems
Temperature - 70 - 78 °F
Relative Humidity - 40 - 60%

TABLE 7

Indoor Air Test Results –Lincoln Elementary School, Lowell, MA – March 16, 2000

Remarks	Carbon Dioxide *ppm	Temp. °F	Relative Humidity %	Occupants in Room	Windows Openable	Ventilation		Remarks
						Intake	Exhaust	
Room 210	787	80	20	1	yes	yes	yes	univent off, books and boxes on univent, door open
Room 208	713	80	19	27	yes	yes	yes	6 CT-some painted over, history of water leaks, window open, 2 plants

Comfort Guidelines

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CT = water-damaged ceiling tiles

Carbon Dioxide -	< 600 ppm = preferred 600 - 800 ppm = acceptable > 800 ppm = indicative of ventilation problems
Temperature -	70 - 78 °F
Relative Humidity -	40 - 60%